

*SUB*

What is claimed is:

1           1. In a gas generating device wherein a fuel material reacts to  
2 generate gas, the improvement comprising:  
3           a first chamber having contents including a quantity of a water-supplying compound  
4           and a quantity of a fuel precursor, the fuel precursor being water reactive; and  
5           an initiator in discharge communication with at least a portion of the  
6           quantity of water-supplying compound content of said first chamber to form water,  
7           with at least a portion of the formed water reacting with at least a portion of the  
8           quantity of fuel precursor to form a quantity of the fuel material and resulting in  
9           opening of said first chamber with a release of at least a portion of the fuel material  
10          therefrom.

1           2. The gas generating device of claim 1 wherein the first chamber  
2           contents include at least a portion of the quantity of water-supplying compound and  
3           at least a portion of the quantity of the fuel precursor stored in direct contact.

1           3. The gas generating device of claim 2 wherein, in a static state, the  
2           first chamber is closed, the gas generating device additionally comprising:  
3           a second chamber in fluid communication with said first chamber upon  
4           the opening of said first chamber, said second chamber containing a quantity of  
5           pressurized stored gas including a quantity of oxidant material, with at least a portion

6 of the fuel material released from said first chamber reacting with at least a portion of  
7 the oxidant material to form product gas, said second chamber adapted to open to emit  
8 at least a portion of the product gas therefrom.

1           4. The gas generating device of claim 1 wherein in an at rest  
2 condition, the quantity of water-supplying compound is stored segregated from the  
3 quantity of the fuel precursor within said first chamber.

1           5. The gas generating device of claim 4 wherein, in a static state, the  
2 first chamber is closed, the gas generating device additionally comprising:  
3           a second chamber in fluid communication with said first chamber upon  
4 the opening of said first chamber, said second chamber containing a quantity of  
5 pressurized stored gas including a quantity of oxidant material, with at least a portion  
6 of the fuel material emitted from said first chamber reacting with at least a portion of  
7 the oxidant material to form product gas, said second chamber adapted to open to emit  
8 at least a portion of the product gas therefrom.

1           6. The gas generating device of claim 1 wherein the first chamber  
2 is defined at least in part by a perforated housing.

1           7. The gas generating device of claim 6 additionally comprising a  
2 second chamber in fluid communication with said first chamber, said second chamber  
3 containing a quantity of pressurized stored gas including a quantity of oxidant  
4 material, with at least a portion of the fuel material released from said first chamber  
5 reacting with at least a portion of the oxidant material to form product gas, said second  
6 chamber adapted to open to emit at least a portion of the product gas therefrom.

1           8. The gas generating device of claim 7 additionally comprising a  
2 liner within the first chamber perforated housing, the liner maintaining the first  
3 chamber contents in discharge communication proximity with the initiator device.

1           9. The gas generating device of claim 1 wherein the fuel precursor  
2 is at least one metal element-containing material selected from the group consisting  
3 of:  
4           hydrides, carbides, alkoxides and combinations thereof.

1           10. The gas generating device of claim 1 wherein the fuel precursor  
2 comprises a metal alkoxide.

1           11. The gas generating device of claim 10 wherein the fuel precursor  
2 comprises an alkali metal.

1           12. The gas generating device of claim 10 wherein the fuel precursor  
2           comprises an alkaline earth metal.

1           13. The gas generating device of claim 1 wherein the fuel precursor  
2           comprises at least one first component selected from the group of metals and  
3           organometallic compounds and at least one second component selected from the group  
4           of carbonates and bicarbonates.

1           14. The gas generating device of claim 1 wherein the fuel precursor  
2           comprises potassium t-butyl carbonate.

1           15. The gas generating device of claim 1 wherein the water-supplying  
2           compound comprises ammonium nitrate.

1           16. The gas generating device of claim 1 wherein the water-supplying  
2           compound comprises an inorganic compound with stabilized waters of hydration.

1           17. The gas generating device of claim 16 wherein the  
2           water-supplying compound comprises hydrated calcium oxylate.

1                   18. An apparatus for inflating an inflatable device, said apparatus  
2 comprising:

3                   a closed first chamber having contents including a quantity of  
4 ammonium nitrate and a quantity of a fuel precursor, the fuel precursor being water  
5 reactive;

6                   an initiator in discharge communication with the contents of the first  
7 chamber for initiating decomposition of at least a portion of the quantity of ammonium  
8 nitrate to form water, with at least a portion of the formed water reacting with at least  
9 a portion of the quantity of fuel precursor to form a fuel material, said first chamber  
10 adapted to open when a predetermined increase in pressure within the first chamber  
11 is realized whereby at least a portion of the fuel material is emitted from said first  
12 chamber, and

13                   a second chamber containing a quantity of pressurized stored gas  
14 including a quantity of oxidant material, said second chamber in fluid communication  
15 with said first chamber upon the opening of said first chamber with at least a portion  
16 of the fuel material emitted from said first chamber reacting with at least a portion of  
17 the oxidant material to form inflation gas, said second chamber adapted to open when  
18 a predetermined increase in pressure within the second chamber is realized whereby  
19 at least a portion of the product gas is emitted from the second chamber to inflate the  
20 inflatable device.

cont'd

1           19. The apparatus of claim 18 wherein the first chamber contents  
2 include at least a portion of the quantity of water-supplying compound and at least a  
3 portion of the quantity of the fuel precursor stored in direct contact.

1           20. The apparatus of claim 18 wherein in an at rest condition, the  
2 quantity of water-supplying compound is stored segregated from the quantity of the  
3 fuel precursor within said first chamber.

1           21. The apparatus of claim 18 wherein the fuel precursor is at least  
2 one metal element-containing material selected from the group consisting of:  
3           hydrides, carbides, alkoxides and combinations thereof.

1           22. The apparatus of claim 18 wherein the fuel precursor comprises  
2 a metal alkoxide.

1           23. The apparatus of claim 18 wherein the fuel precursor comprises  
2 at least one first component selected from the group of metals and organometallic  
3 compounds and at least one second component selected from the group of carbonates  
4 and bicarbonates.

1           24. The apparatus of claim 18 wherein the fuel precursor comprises  
2 potassium t-butyl carbonate.

1           25. In a method for inflating an inflatable safety device via an inflator  
2 device wherein a fuel material reacts to form gas generation reaction products, the  
3 improvement comprising:

4           heating a mixture containing at least a water-supplying compound and  
5 a water-reactive fuel precursor within the inflator device to form the fuel material in  
6 situ.

No comb exp

1           26. The method of claim 25 additionally comprising:  
2           contacting the formed fuel material with a quantity of compressed gas,  
3 the compressed gas including a quantity of oxidant,  
4           reacting at least a portion of the formed fuel material with at least a  
5 portion of the quantity of oxidant to produce heat,  
6           heating a stored quantity of inert gas with at least a portion of the  
7 produced heat to form an increased volume of gas and  
8           passing at least a portion of the increased volume of gas into the  
9 inflatable safety device to effect the inflation thereof.

1           27. The method of claim 25 wherein the fuel precursor is at least one  
2           metal element-containing material selected from the group consisting of:  
3                   hydrides, carbides, alkoxides and combinations thereof.

1           28. The method of claim 25 wherein the fuel precursor comprises a  
2           metal alkoxide.

1           29. The method of claim 25 wherein the fuel precursor comprises at  
2           least one first component selected from the group of metals and organometallic  
3           compounds and at least one second component selected from the group of carbonates  
4           and bicarbonates.

1           30. The method of claim 25 wherein the fuel precursor comprises  
2           potassium t-butyl carbonate.

1           31. The method of claim 25 wherein the water-supplying compound  
2           comprises ammonium nitrate.

1           32. In a vehicular inflatable safety assembly wherein a fuel material  
2           reacts to form gas generation reaction products, the improvement comprising:

3                   the vehicular inflatable safety assembly containing a quantity of a  
4                   water-supplying compound and a quantity of a water-reactive fuel precursor effective  
5                   upon initiation to form the fuel material in situ.

1                   33.     The vehicular inflatable safety assembly of claim 32 wherein the  
2                   fuel precursor is at least one metal element-containing material selected from the  
3                   group consisting of:

4                   hydrides, carbides, alkoxides and combinations thereof.

1                   34.     The vehicular inflatable safety assembly of claim 32 wherein the  
2                   fuel precursor comprises a metal alkoxide.

1                   35.     The vehicular inflatable safety assembly of claim 32 wherein the  
2                   fuel precursor comprises potassium t-butyl carbonate.

qab  
a'